WHAT IS CLAIMED IS:

1. A nonvolatile semiconductor memory device comprising:

(a) a first insulator film formed above a semiconductor substrate;

(b) silicon nitride dots formed on said first insulator film;

(c) a second insulator film formed on said silicon nitride dots;

(d) a conductive film formed on said second insulator film;

(e) first and second semiconductor regions formed in said semiconductor substrate;

(f) a channel region located between said first and second semiconductor regions, wherein

(g) programming is performed by injecting charges from said channel region into said silicon nitride dots on a first end portion of said channel region on a side of said first semiconductor region or into said silicon nitride dots on a second end portion of said channel region on a side of said second semiconductor region.

2. The nonvolatile semiconductor memory device according to claim 1, wherein

said first and second semiconductor regions extend in a first direction, and

said conductive film extends in a second direction orthogonal to said first direction.

3. The nonvolatile semiconductor memory device according to claim 1, wherein

said first and second insulator films are larger in barrier height than silicon nitride.

4. The nonvolatile semiconductor memory device according to claim 1, wherein

said first and second insulator films are silicon oxide films.

5. The nonvolatile semiconductor memory device according to claim 1, wherein

injection of said charges into said silicon nitride dots on said first end portion is conducted by carrying electrons from said second semiconductor region toward said first semiconductor region,

injection of said charges into said silicon nitride dots on said second end portion is conducted by carrying electrons from said first semiconductor region toward said second semiconductor region,

said charges injected into said silicon nitride dots on said first end portion are determined by carrying the electrons from said first semiconductor region to said second semiconductor region, and

said charges injected into said silicon nitride dots on said second end portion are determined by carrying the electrons from said second semiconductor region to said first

semiconductor region.

6. The nonvolatile semiconductor memory device according to claim 1, wherein

said silicon nitride dots are Si_XN_{1-X}, where $0<X<1$.

7. The nonvolatile semiconductor memory device according to claim 6, wherein

The X in said Si_XN_{1-X} is approximately 0.43.

8. The nonvolatile semiconductor memory device according to claim 1, wherein

a surface portion of said silicon nitride dots is higher in nitrogen concentration than a central portion of said silicon nitride dots.

9. The nonvolatile semiconductor memory device according to claim 1, wherein

said silicon nitride dots are present as a single layer on said first insulator film.

10. A nonvolatile semiconductor memory device comprising:

(a) first and second semiconductor regions formed in a semiconductor substrate;

(b) a channel region located between said first and second semiconductor regions;

(c) a first silicon oxide film formed above said

semiconductor substrate, and extending from above said channel region toward above said first semiconductor region;

(d) silicon nitride dots formed on said first silicon oxide film;

(e) a second silicon oxide film formed on said silicon nitride dots;

(f) a first conductive film formed on said second silicon oxide film;

(g) an insulator film formed above said semiconductor substrate, and extending from above said channel region toward above said second semiconductor region; and

(h) a second conductive film formed on said insulator film, wherein

(i) programming is performed by injecting charges from said channel region into said silicon nitride dots on an end portion of said channel region on a side of said second semiconductor region.

11. The nonvolatile semiconductor memory device according to claim 10, wherein

said first and second semiconductor regions extend in a first direction,

said first conductive film extends in a second direction orthogonal to said first direction, and

said second conductive film extends in said first direction.

12. The nonvolatile semiconductor memory device according to claim 10, wherein

said first and second silicon oxide films are Si_xO_2, where $X \leq 1$.

13. The nonvolatile semiconductor memory device according to claim 10, wherein

said first silicon oxide film is a thermal oxide film, and said second silicon oxide film is a deposited film.

14. The nonvolatile semiconductor memory device according to claim 10, wherein

injection of said charges into said silicon nitride dots is conducted by carrying electrons from said second semiconductor region toward said first semiconductor region, and

said charges injected into said silicon nitride dots are determined by carrying the electrons from said first semiconductor region to said second semiconductor region.

15. The nonvolatile semiconductor memory device according to claim 10, wherein

said silicon nitride dots are Si_xN_{1-x}, where $0<X<1$.

16. The nonvolatile semiconductor memory device according to claim 15, wherein

The X in said Si_xN_{1-x} is approximately 0.43.

17. The nonvolatile semiconductor memory device according to claim 10, wherein

a surface portion of said silicon nitride dots is higher in nitrogen concentration than a central portion of said silicon nitride dots.

18. The nonvolatile semiconductor memory device according to claim 10, wherein

said silicon nitride dots are present as a single layer on said first silicon oxide film.

19. The nonvolatile semiconductor memory device according to claim 10, wherein

said first and second semiconductor regions and said first and second conductive films extend in a same direction, and

said second conductive film extends to be mounting up above said first conductive film.

20. A nonvolatile semiconductor memory device comprising:

(a) first and second semiconductor regions formed in a semiconductor substrate;

(b) a channel region located between said first and second semiconductor regions;

(c) a first insulator film formed above said semiconductor substrate, and extending from above said channel

region toward above said first semiconductor region;

(d) a first conductive film formed on said first insulator film;

(e) a second insulator film formed above said semiconductor substrate, and extending from above said channel region toward above said second semiconductor region;

(f) a second conductive film formed on said second insulator film;

(g) a third insulator film formed above the semiconductor substrate between said first and second conductive films;

(h) silicon nitride dots formed on said third insulator film;

(i) a fourth insulator film formed on said silicon nitride dots; and

(j) a third conductive film formed on said silicon nitride dots, wherein

(k) programming is performed by injecting charges from said channel region into said silicon nitride dots on a first end portion on a side of said first conductive film or into said silicon nitride dots on a second end portion on a side of said second conductive film.

21. The nonvolatile semiconductor memory device according to claim 20, wherein

said first and second semiconductor regions extend in a first direction,

said first and second conductive films extend in said

first direction, and

said third conductive film extends in a second direction orthogonal to said first direction.

22. The nonvolatile semiconductor memory device according to claim 20, wherein

said third and fourth insulator films are larger in barrier height than silicon nitride.

23. The nonvolatile semiconductor memory device according to claim 20, wherein

said third and fourth insulator films are silicon oxide films.

24. The nonvolatile semiconductor memory device according to claim 20, wherein

injection of said charges into said silicon nitride dots on said first end portion is conducted by carrying electrons from said first semiconductor region toward said second semiconductor region,

injection of said charges into said silicon nitride dots on said second end portion is conducted by carrying electrons from said second semiconductor region toward said first semiconductor region,

said charges injected into said silicon nitride dots on said first end portion are determined by carrying the electrons from said second semiconductor region to said first

semiconductor region, and

said charges injected into said silicon nitride dots on said second end portion are determined by carrying the electrons from said first semiconductor region to said second semiconductor region.

25. The nonvolatile semiconductor memory device according to claim 20, wherein

said silicon nitride dots are Si_XN_{1-X}, where $0<X<1$.

26. The nonvolatile semiconductor memory device according to claim 25, wherein

The X in said Si_XN_{1-X} is approximately 0.43.

27. The nonvolatile semiconductor memory device according to claim 20, wherein

a surface portion of said silicon nitride dots is higher in nitrogen concentration than a central portion of said silicon nitride dots.

28. The nonvolatile semiconductor memory device according to claim 20, wherein

said silicon nitride dots are present as a single layer on said third insulator film.

29. A nonvolatile semiconductor memory device comprising:

(a) first and second semiconductor regions formed in a

semiconductor substrate;

(b) a channel region located between said first and second semiconductor regions;

(c) a first insulator film formed above said semiconductor substrate on said channel region;

(d) a first conductive film formed on said first insulator film;

(e) a second insulator film formed above said semiconductor substrate on both sides of said first conductive film;

(f) silicon nitride dots formed on said second insulator film;

(g) a third insulator film formed on said silicon nitride dots; and

(h) a second conductive film formed on said third insulator film, wherein

(i) programming is performed by injecting charges into said silicon nitride dots adjacent to the both sides of said first conductive film, respectively.

30. A method of manufacturing a nonvolatile semiconductor memory device comprising the steps of:

(a) forming first and second semiconductor regions in a semiconductor substrate;

(b) forming a first insulator film on said first and second semiconductor regions;

(c) precipitating silicon dots on said first insulator

film;

(d) forming silicon nitride dots by nitriding said silicon dots;

(e) forming a second insulator film on said silicon nitride dots; and

(f) forming a conductive film on said second insulator film.

31. The nonvolatile semiconductor memory device manufacturing method according to claim 30, wherein

said step (d) is executed in a plasma atmosphere.

32. A method of manufacturing a nonvolatile semiconductor memory device comprising the steps of:

(a) forming a first conductive film above a semiconductor substrate through a first insulator film;

(b) forming a semiconductor region under a first sidewall of said first conductive film using a tilted ion implantation method;

(c) forming a second insulator film above said semiconductor substrate on a side of a second sidewall opposite to said first sidewall of said first conductive film;

(d) precipitating silicon dots on said second insulator film;

(e) forming silicon nitride dots by nitriding said silicon dots;

(f) forming a third insulator film on said silicon

nitride dots; and

(g) forming a second conductive film on said third insulator film.

33. The nonvolatile semiconductor memory device manufacturing method according to claim 32, wherein

said step (e) is executed in a plasma atmosphere.

34. The nonvolatile semiconductor memory device manufacturing method according to claim 33, wherein

said step (c) is a step of forming a first silicon oxide film by thermal oxidation, and

said step (f) is a step of forming a second silicon oxide film by a chemical vapor deposition method.

35. A method of manufacturing a nonvolatile semiconductor memory device comprising the steps of:

(a) forming a plurality of first conductive films in a form of lines above a semiconductor substrate through a first insulator film;

(b) forming a second insulator film above said semiconductor substrate between said first conductive films;

(c) precipitating silicon dots on said second insulator film;

(d) forming silicon nitride dots by nitriding said silicon dots;

(e) forming a third insulator film on said silicon

nitride dots; and

(f) forming a second conductive film on said third insulator film.

36. The nonvolatile semiconductor memory device manufacturing method according to claim 35, wherein

said step (d) is executed in a plasma atmosphere.

37. The nonvolatile semiconductor memory device manufacturing method according to claim 35, wherein

said step (b) is a step of forming a first silicon oxide film by thermal oxidation, and

said step (e) is a step of forming a second silicon oxide film by a chemical vapor deposition method.

38. The nonvolatile semiconductor memory device manufacturing method according to claim 35, wherein

after said step (a), semiconductor regions are formed in said semiconductor substrate between said first conductive films in every other space between said first conductive films.

39. The nonvolatile semiconductor memory device manufacturing method according to claim 35, wherein

before said step (a), semiconductor regions are formed in said semiconductor substrate below said first conductive films every other first conductive film of said plurality of first conductive films in the form of lines.

40. A method of manufacturing a nonvolatile semiconductor memory device comprising the steps of:

(a) forming a first insulator film above a semiconductor substrate;

(b) precipitating silicon dots on said first insulator film;

(c) forming silicon nitride dots by nitriding said silicon dots;

(d) forming a second insulator film on said silicon nitride dots;

(e) forming a first conductive film on said second insulator film;

(f) forming a third insulator film above said semiconductor substrate on an end portion of said second insulator film;

(g) forming a second conductive film extending from above said third insulator film toward above a fourth insulator film formed above said first conductive film; and

(h) forming a semiconductor region in said semiconductor substrate on both end portions of said first and second conductive films.

41. The nonvolatile semiconductor memory device manufacturing method according to claim 40, wherein

said step (c) is executed in a plasma atmosphere.